Energy Conservation

and Homecare Network

ECHONET Consortium
The ECHONET Consortium was established in 1997 with the aim of realizing an affluent 21st-century society where people are in harmony with the environment. And thanks to the efforts and cooperation of all stakeholders, last fiscal year we were able to hold a symposium commemorating the Consortium’s 20th anniversary.

ECHONET Consortium seeks to make positive contributions in areas such as CO₂ emissions reduction, global environmental issues, energy issues, and the aging of society by promoting the standardization of home network infrastructure technology specifications, so as to enable interconnection of various vendors’ household appliances, residential equipment, sensors, controllers, and other devices. In 2011 we released the ECHONET Lite specifications, which are compatible with standard protocols both in Japan and abroad. Smart Community Alliance International Standardization Working Group, Smart house Standardization Investigation Committee recommended ECHONET Lite as a public HEMS standard interface in 2011, and in 2015 ECHONET Lite was approved as an international standard. Also, we formulated the ECHONET Lite AIF (Application Interface) specifications with the aims of improving interoperability between multiple vendors, and with the launch of a certification system in 2016. Now the installation of ECHONET Lite in various devices, mainly the eight kind of priority devices (air conditioners, storage batteries, hot water supply systems, solar power equipment, fuel cells, lighting, smart meters and electric vehicle dischargers and chargers), has increasingly become common.

In addition, in 2017 we strengthened our partnerships with the Japan Electrical Manufacturers’ Association (JEMA) and Japan Federation of Housing Organizations (JUDANREN), and have created the House Performance Catalog and worked to disseminate HEMS and IoT smart home. Thanks to the efforts of all our member companies, the number of ECHONET Lite specifications-compliant products exceeds 48 million units as of FY2017.

At the same time, surveying the global situation, we see the impact of environmental pollution and climate change growing more serious and the need for countermeasures becoming ever more urgent. United Nations Summit has established Sustainable Development Goals (SDGs) to respond to these issues, and the Government of Japan has outlined “Society 5.0” as an initiative to realize the SDGs, aiming for a super smart society where cyberspace and the physical world are in harmony. ECHONET Consortium is in accord with these principles, and we are launching the new strategy ECHONET 2.0 to demonstrate a viable platform for the Internet of Things (IoT) so as to contribute to realization of a sustainable society in the coming age. Specifically, we will promote IoT networking, expansion of IoT applications, research and development on effective linking of services in the cloud era, and creation of mechanisms to deliver a wide variety of services.

Through the widespread incorporation of ECHONET Lite and ECHONET Lite AIF specifications, we aim to pursue activities that contribute to realization of a prosperous and sustainable society. We appreciate the continued support and cooperation of all stakeholders.
As Japanese energy consumption moves towards energy saving, particularly in the industry sector, the development of energy saving products has become popular. After reaching a peak in FY2004, the energy consumption has been on a downward trend. We have seen a further decrease since FY2011 after an increase in awareness of energy saving following the Great East Japan earthquake.

However, when looking at trends by sector for growth between FY1973 and FY2014, there was a slight increase (1.0 times) for the commercial and business sector with the progress in energy saving, mainly in the manufacturing industry. There was a much larger increase for the household sector and the transportation sector. In particular, with the household sector, the result of a 2.0 times increase was that the share making up consumption as a whole changed from 8.9% at the time of the oil shock in FY1973 to 14.3% in 2014.

On the other hand, in the “Action Plan for Building a Low Carbon Society” drawn up by the government in 2008, a policy was taken for promoting the deployment of solar power generation. A policy was demonstrated to increase deployment by 20 times (28GW) by 2020. Based on this, it has increased by an average of approximately 640MW per month, and this is forecast to reach approximately 140GW by 2030.

The result of this is that the generated power has exceeded demand from business offices and homes is flowing into the power distribution system and as this has caused a rise in voltage in the power distribution system, it has the potential to interrupt the high quality and stable provision of power. In order to prevent this, in addition to promoting technical development that would restrain the amount of power generated by solar power generation, there are calls to promote the deployment of equipment that can store energy, such as electric vehicles, storage batteries and heat pump water heaters, thus “creating electricity”, “storing electricity” and “efficiently using electricity”.

Further, in regard to the measurement of power quantity used, electronic next-generation smart
meters are already being deployed overseas. Domestically, however, there is now a duty to deploy smart meters in all households, and the objective is to complete deployment in all houses by 2025. Deployment started by all power companies from July 2015.

This smart meter uses a means of transmitting information known as “route A” for the measurement of used electricity in previous one month intervals, and can measure the used amount automatically every 30 minutes. Further, using the “route B” means of transmitting information attached to the smart meter, the electricity usage status measured by the smart meter can be acquired in the home as well, enabling us to use electricity efficiently within the home as well.

As this “route B” means of transmitting information has been adopted by the ECHONET Lite Specifications, products using the ECHONET Lite Specifications have become popular within the home.

<table>
<thead>
<tr>
<th>Smart Meter</th>
<th>Conventional power meter</th>
</tr>
</thead>
<tbody>
<tr>
<td>External appearance</td>
<td><img src="image1" alt="Smart Meter Image" /> <img src="image2" alt="Conventional Power Meter Image" /></td>
</tr>
<tr>
<td>Note: The external appearance shown is just one example. This may differ from the actual article.</td>
<td></td>
</tr>
<tr>
<td>Meter inspection work</td>
<td>Automatic meter reading using communications (route A)</td>
</tr>
<tr>
<td></td>
<td>Meter reading by staff</td>
</tr>
<tr>
<td>Measuring interval</td>
<td>30 minutes</td>
</tr>
<tr>
<td></td>
<td>1 month</td>
</tr>
<tr>
<td>Provide information within home (HEMS connection)</td>
<td>Providing information by ECHONET Lite (route B)</td>
</tr>
<tr>
<td></td>
<td>None</td>
</tr>
<tr>
<td>Other merits of smart meters</td>
<td>• Lowering burden on customers when moving</td>
</tr>
<tr>
<td></td>
<td>• Simplification of changes to contracted amperes</td>
</tr>
<tr>
<td></td>
<td>• Rapid recovery after a power failure etc.</td>
</tr>
</tbody>
</table>

Source: Smart Meter System Planning Committee (15th) -distributed material http://www.meti.go.jp/committee/summary/0004668/015_haiifu.html

On the other hand, in the field of information technology, the IoT (Internet of Things) has been proposed, enabling things to be interconnected via the Internet. This promises to create new value, through the utilization of huge amounts of collected data.

In the home network field as well, through the use of IoT technology, home appliances, residential equipment and a variety of sensors can be connected in a cloud server environment via the Internet. Through the linking of external and information within the premises, we are able to provide a fulfilling lifestyle (QOL: Quality of Life improvement services) to our customers, through automatic controls for the efficient use of energy and security monitoring etc.

Moving forward, it is expected that we will see the spread of IoT homes, in which IoT technology is merged with home networks based on the ECHONET Lite Specifications.
◆ Well-known standards for realizing Smart Houses/ECHONET Lite

The ECHONET Lite Specifications published in 2011 were later recommended as the well-known standard interface for home networks by the Japan Smart Community Alliance established by the Ministry of Economy, Trade and Industry (METI). Based on this, ECHONET Consortium constructed a framework for improved inter-connectivity between multiple vendors, including the establishment of a certification system and the standardization of methods for operating 8 key devices.
### Roadmap for Expansion and Promotion

#### Roadmap for home network market formation/expansion via ECHONET Lite

<table>
<thead>
<tr>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>(Home) Making ZEH (net zero energy house) the standard new residence</td>
<td>(Buildings) Achieve ZEB (net zero energy building) for new public buildings etc.</td>
<td>Average of new residences with ZEH</td>
<td>Average of new buildings with ZEB</td>
<td>Propagation HEMS to all households till 2030</td>
<td>Complete deregulation of power retailing</td>
<td>Separation of power generation &amp; distribution/charge deregulation</td>
</tr>
</tbody>
</table>

#### Environment surrounding ECHONET

- Schedule related to promotion of low carbon homes*
- HEMS promotion policies?*
- Energy policies

#### Schedule related to promotion of low carbon homes

- **Vision**
  - HEMS connections, utilizing route B and HEMS controller
  - Usage, Cloud connections for stores/condominiums to small/medium-sized buildings
  - Use with IoT/M2M
  - Promotion and expansion overseas

- **No. of target shipments**
  - (Domestic)
  - Spread to 8 key devices
  - 2M units
  - 4M units
  - 6M units
  - 8M units
  - 10M units/year

  - (Overseas)
  - 10K units
  - 100K units
  - 1M units
  - 5M units
  - 10M units

#### Domestic markets

- Product introduction on home page, holding of forums and seminars, and promotion at exhibitions
- Market survey in Asia
- HEMS market surveys overseas (Europe/America + Asia), draw up promotion and education programs

#### Overseas markets

- Controller definition
- Expand application of AIF specifications and certification test specifications, device object detailed specifications (twice/year)
- Third party certification system
- Enrichment of certification and test bodies
- Investigate expansion of certification range (software, system, servers), investigate engineer certification system

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*2 Source: “Outline of Green Policies (main points)”, November 2012, National Strategy Office
Features of the ECHONET Lite Specifications

- Achieving a multi-vendor environment through common specifications
  Enables the interconnection and control of equipment from different vendors
- Possibility of using different types of existing standard transmission media
  A system can be constructed using widely diffused standard transmission media, such as wired LAN (Ethernet) and wireless LAN (Wi-Fi)
- Compatible with a wide range of equipment, such as residential equipment and devices for small/medium-sized buildings and shops etc.
  Commands already defined for 100 or more types of equipment. Commands for new equipment can be added as required.
- Possible to collaborate on services using the Cloud
  Possible to realize sophisticated services through the collaboration with a diverse array of systems on the Internet
- Possible to design network ready equipment
  Through the use of a middleware adapter interface, equipment can be purchased in advance and the system deployed after adding network functionality (adapters) at a later date

Layer configuration

By allowing the use of standard transmission media, a simpler configuration is possible that does not require the 1-4 layered specifications mandated by the previous ECHONET Specifications.
Target equipment of ECHONET (ECHONET device objects)

- Attributes of Housing/Facilities equipment and home appliances are modeled as the ECHONET device objects and their details are specified.

- Equipment stipulated in the ECHONET device objects

<table>
<thead>
<tr>
<th>Class Group Code</th>
<th>Class group</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x00</td>
<td>Sensor-related Device Class Group</td>
<td>Fire sensors, motion detection sensors, temperature sensors, CO2 sensors, electric energy sensors, etc.</td>
</tr>
<tr>
<td>0x01</td>
<td>Air Conditioner-related Device Group</td>
<td>Air conditioners, fans, ventilation fans, air cleaners, heated carpets, oil fan heaters, etc.</td>
</tr>
<tr>
<td>0x02</td>
<td>Housing/Facilities-related Device Class Group</td>
<td>Electrically operated shades/curtains, water heaters, electrically operated locks, smart heaters, smart meters, solar power generations, storage batteries, fuel cells, general lightings, single function lightings, emergency lights, etc.</td>
</tr>
<tr>
<td>0x03</td>
<td>Cooking/Household-related Device Class Group</td>
<td>Microwave oven, dishwasher machines, dish drying machines, washing machines, clothes drying machines etc.</td>
</tr>
<tr>
<td>0x04</td>
<td>Health-related Device Class Group</td>
<td>Weighing machine, body fat analyzers, thermometers, blood pressure meters, blood glucose meters etc.</td>
</tr>
<tr>
<td>0x05</td>
<td>Management/Operation-related Device Class Group</td>
<td>Controllers, switch (HA), etc.</td>
</tr>
<tr>
<td>0x06</td>
<td>Audiovisual-related Device Class Group</td>
<td>Television, display, etc.</td>
</tr>
</tbody>
</table>

Content of the 8 Key Devices and Application Interface (AIF) Certification Specifications

In order to promote energy saving in the household sector, the government has determined “8 key devices” as home appliances and residential equipment related to energy, and promoted their utilization (optimized control).

For the 8 key devices, in addition to the ECHONET Lite specifications, we have also drawn up the application interface specifications.

These 8 key devices are designated as smart meters, solar power generations, storage batteries, fuel cells, air conditioners, lightings equipment, water heaters and charging/discharging equipment for electric vehicles.
The ECHONET Lite certification system is comprised of two certifications --- the ECHONET Lite specifications certification and the ECHONET Lite AIF specifications certification. The ECHONET Lite certification is a self-conformance test carried out by the certification applicant based on the certification test specification, and certification is judged based on the written application including the result of the test by the certification body.

On the other hand, with the ECHONET Lite AIF certification, certification is obtained by first taking a test by the authorized test lab., then passing an examination about the test result by the certification body.

However, as for smart meters, either for the ECHONET Lite certification or the ECHONET Lite AIF certification, it is mandatory to pass the test by the authorized test lab.

The ECHONET Consortium has accredited the following authorities as certification bodies or authorized test labs.

With the authorized test labs, support or non-support for the tested device or the test method is different, so please confirm at the ECHONET Consortium home page.

(as of April, 2018)

<table>
<thead>
<tr>
<th>Certification bodies (7 bodies)</th>
<th>Authorized test lab. (7 bodies)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Japan Electric Meters Inspection Corporation</td>
<td>Japan Electric Meters Inspection Corporation</td>
</tr>
<tr>
<td>UL Japan, Inc.</td>
<td>Japan Electrical Safety &amp; Environment Technology Laboratories (JET)</td>
</tr>
<tr>
<td>TÜV Rheinland Japan Ltd.</td>
<td>TÜV Rheinland Japan Ltd.</td>
</tr>
<tr>
<td>Telecom Engineering Center</td>
<td>Telecom Engineering Center</td>
</tr>
<tr>
<td>Japan Electrical Safety &amp; Environment Technology Laboratories (JET)</td>
<td>Japan Gas Appliances Inspection Association</td>
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<tr>
<td>Japan Gas Appliances Inspection Association</td>
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</tr>
</tbody>
</table>

Products achieving certification with the ECHONET Specifications, ECHONET Lite Specifications or ECHONET Lite AIF Specifications are published on the ECHONET Consortium home page.
- Committees -

**Steering Committee**
Engaged in a comprehensive range of activities to ensure the smooth, efficient operation of the Consortium. Responsibilities include planning, budget management, and administration of general assemblies and forums. Also responsible for organizing and coordinating committees and working groups.

**Technical Committee**
Engaged in the development of specifications of ECHONET Lite and ECHONET Lite AIF, which will be the building blocks of the next-generation network system. Also investigating about the interoperability and engaged in PlugFest.

**Promotion Committee**
Engaged in public relations to promote acceptance of the next-generation network system developed and standardized by the Consortium. It is also involved in the holding of seminars and exhibiting at exhibitions.
Overview of ECHONET Consortium activities

- **ECHONET Forums (twice/year)**
  Special lectures have been given by outside experts, products introduced by the member companies, and the status of ECHONET Consortium activities reported.

- **Development of the ECHONET Lite Specifications**
  We are continually engaged in the addition and revision of ECHONET device objects, and are constantly developing the ECHONET Lite Specifications, etc.

- **International standardization**
  The ECHONET Lite specification has been proposing to international standardization bodies, such as the IEC and ISO/IEC. Through these activities, we are increasing international awareness of the ECHONET Lite specifications and contributing to the expansion of business potential overseas.

- **PlugFest**
  We are providing a venue for the members of each company to bring their products and conduct inter-connectivity tests.

- **Exhibitions**
  We are exhibiting to promote the ECHONET Lite Specifications and the compatible products of member companies.

- **Cooperation with government and related organizations**
  We are participating in government-sponsored commissions, and through joint projects with domestic and international home network standardization organizations and related industry organizations, we are contributing to the formation of the home network market.

◆ Membership

Advantages of membership

- Members can view and offer opinions concerning drafts during development of the ECHONET Specifications.
- Members can participate in Forums, where they can obtain information on standardization and industrial trends concerning home networks and HEMS.
- Members can display products at seminars, forums, and exhibitions.
- Members can participate in PlugFest.
- Members can propose ECHONET device objects.
- Members can use trademarks of ECHONET™, ECHONET Lite™, ECHONET Ready™ and ECHONET Lite AIF™. Further, they can use the ECHONET trademark.
- Members are provided maker codes needed to develop ECHONET Specification-compliant products.
- Members can view the members-only website as well as the latest standards.
- Members can subscribe to News Letters.
## Membership structure

<table>
<thead>
<tr>
<th>Eligibility</th>
<th>Managing member*1</th>
<th>General member*1</th>
<th>Academic member</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Company recognized as being capable of making a technical contribution to ECHONET</td>
<td>Any company in the world having interest in ECHONET</td>
<td>Educational institution having interest in ECHONET (university laboratory, etc.)</td>
</tr>
<tr>
<td>Annual membership fee*2</td>
<td>3,000,000 yen</td>
<td>300,000 yen</td>
<td>—</td>
</tr>
<tr>
<td>Device object proposals</td>
<td>○</td>
<td>○</td>
<td>○*3</td>
</tr>
<tr>
<td>Viewing of specification (after approval)</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Approval of final specification (voting right)</td>
<td>○</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Viewing of specification drafts and presentation of opinions</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Viewing of certification specifications</td>
<td>○</td>
<td>○</td>
<td>—*4</td>
</tr>
<tr>
<td>Participation in General Meetings</td>
<td>○</td>
<td>○</td>
<td>—</td>
</tr>
<tr>
<td>Participation in Board Meetings</td>
<td>○</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Participation in Working Groups</td>
<td>○</td>
<td>○*3</td>
<td>—</td>
</tr>
<tr>
<td>Participation in Forums</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Participation in PlugFests</td>
<td>○</td>
<td>○</td>
<td>—</td>
</tr>
<tr>
<td>Use of trademarks</td>
<td>○</td>
<td>○</td>
<td>—</td>
</tr>
<tr>
<td>Supply of maker codes</td>
<td>○</td>
<td>○</td>
<td>—</td>
</tr>
<tr>
<td>Viewing of members-only website</td>
<td>○</td>
<td>○</td>
<td>—*4</td>
</tr>
<tr>
<td>Subscription to “News Letter”</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>

*1: Managing member or general member can assign affiliated companies as associate members. Annual membership fee for associate member is free of charge and membership rights are the same as a general member.
*2: Annual membership fees are applied to all areas of the ECHONET Consortium’s operation and are exempt from taxation.
*3: On request of the upper committee, the general member can participate and make proposals in the Working Group.
*4: Necessary materials are provided by the ECHONET Consortium based on requests from the members.

## How to apply for membership

### General membership

Membership applications are accepted via the following website:
Website: [https://echonet.jp/admission_en/](https://echonet.jp/admission_en/)

### Academic membership

Applications can be made via the following website.
Website: [https://echonet.jp/admission_en/](https://echonet.jp/admission_en/)
Please inquire with the ECHONET Consortium Secretariat for details.

## Secretariat

Shimbashi TS Bldg.4F, 1-22-5 Nishi-Shimbashi, Minato-ku, Tokyo 105-0003 JAPAN
Tel: +81-3-6205-4142 Fax: +81-3-6205-4143
E-mail: info@echonet.jp
URL: [https://echonet.jp/english/](https://echonet.jp/english/)
The ECHONET logo represents people as the central player of ECHONET surrounded by systems and the environment. The continuous line reflects how human life is inextricably linked with systems and the environment. Blue represents the color of the sea which nurtures life, the color of a clear sky spreading toward the future, and the color of a clean environment which is the target of ECHONET. The Logo will be marked on home appliances which meet the ECHONET Specification.

ECHONET, エコネット, ECHONETLite, ECHONETReady, ECHONETLiteAll, and the above logo are the registered trademarks of the ECHONET Consortium respectively.